Thermo Scientific APEX 500 Rx Metal Detector User's Guide

REC 4345 Rev B
Part number 109541—English

Thermo SCIENTIFIC

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For future reference, write your APEX 500 Rx serial number below.

APEX 500 Rx serial # = _____

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Getting Started

Congratulations on the purchase of your new Thermo Scientific APEX 500 Rx metal detector!

The purpose of this manual is to help you get your APEX 500 Rx up and running as quickly as possible. This manual covers the following topics.

- Installing your APEX 500 Rx
- Setting operator and other passwords
- Checking sensitivity (the APEX's ability to detect metallic contaminants)
- Troubleshooting

This manual—please note—is only a *supplement* to the main APEX *User's Guide*. As a result, you should consult the main APEX *User's Guide* for complete information on safely using, installing, operating, maintaining, and troubleshooting your APEX 500 Rx.

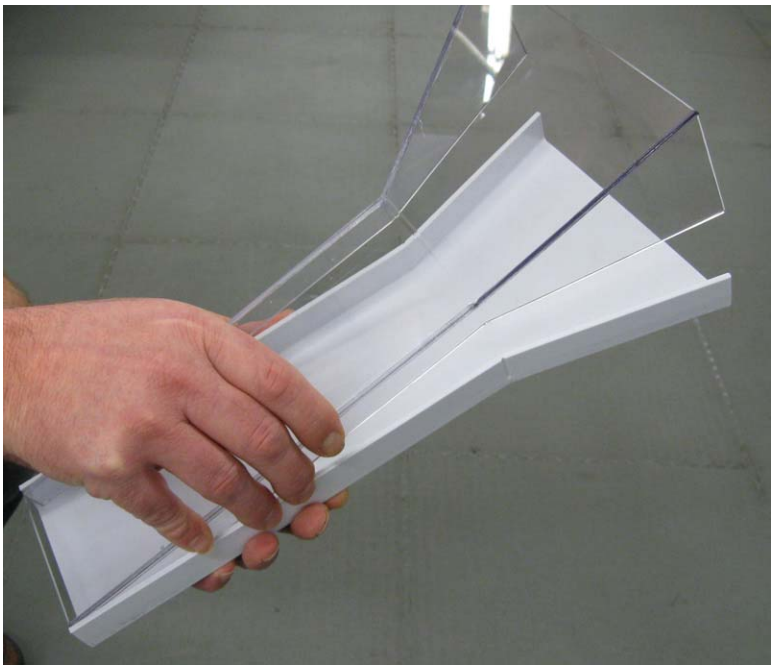
Installing Your APEX 500 Rx

This section tells you how to install the input and output chutes, align the APEX 500 Rx in your production line, and connect the main power and compressed-air supplies.

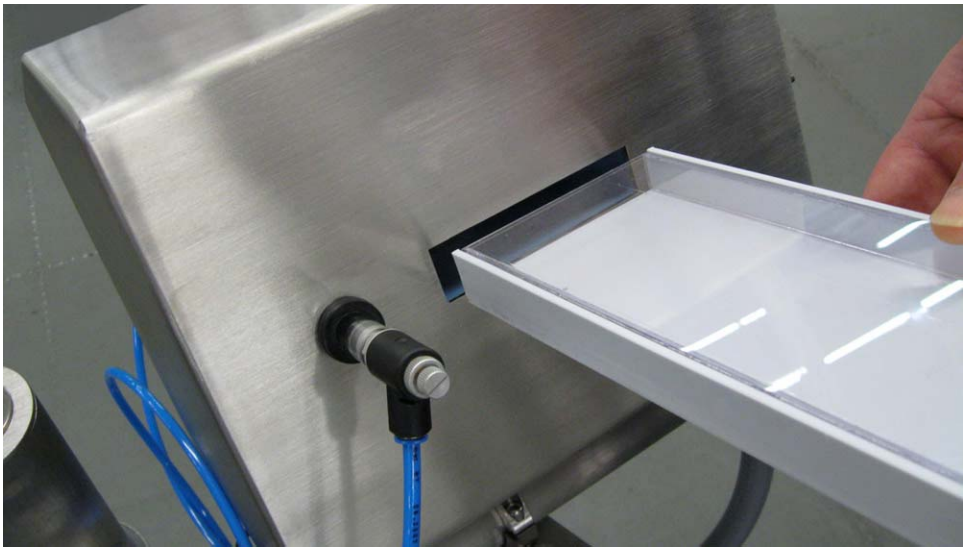
Installing the Input and Output Chutes

Here are the instructions for attaching the input and output chutes to your APEX.

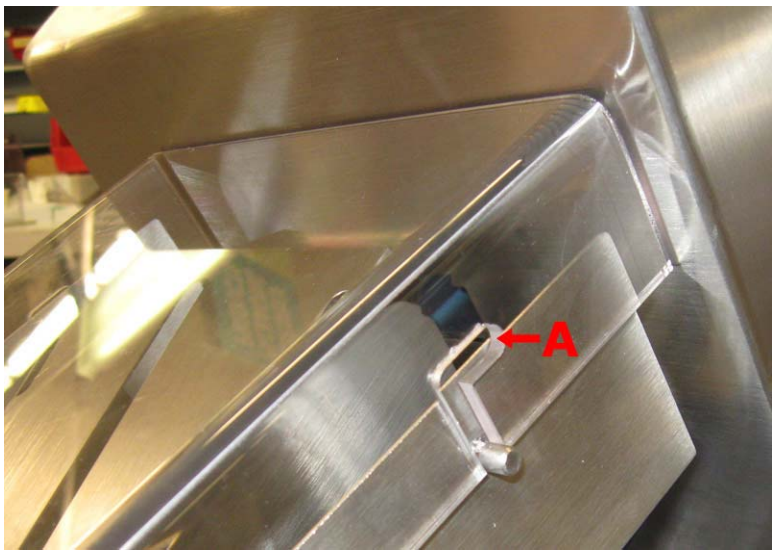
1) Match up the top and bottom halves of the input chute.



2) Slide the input chute into the search-head opening in the APEX.



3) Attach the top cover of the output chute by aligning it with the stainless steel pins on the side of the output chute. Make sure the pins are resting in position A.

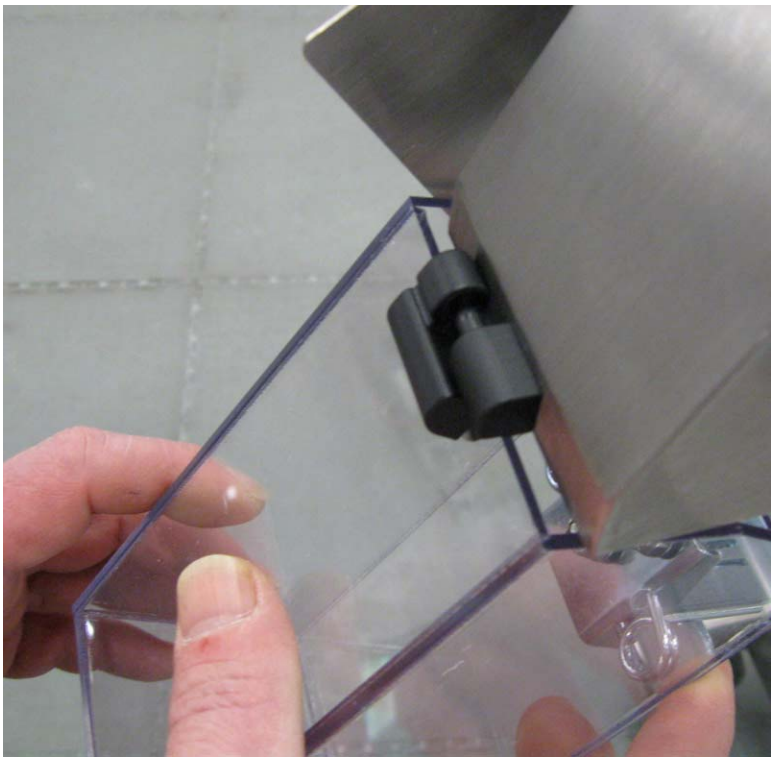


4) Insert the reject chute onto the reject solenoid shaft. Make sure the key is correctly aligned.

5) Firmly attach the reject chute to the reject solenoid shaft using the supplied M5 hex wrench. Tighten the M5 hex screw to 6 ft-lb (8N-m).

6) Attach the reject bin by doing the following.

   a) Slide the reject bin over the plastic pin on the APEX output chute.



b) Latch and lock the fastener on the reject bin to firmly attach the reject chute to the APEX output chute.

7) Loosen the wheel locks on the APEX carrier and roll the APEX into position in your production line. Lock the wheels again to ensure the carrier is totally immobilized on your factory floor.

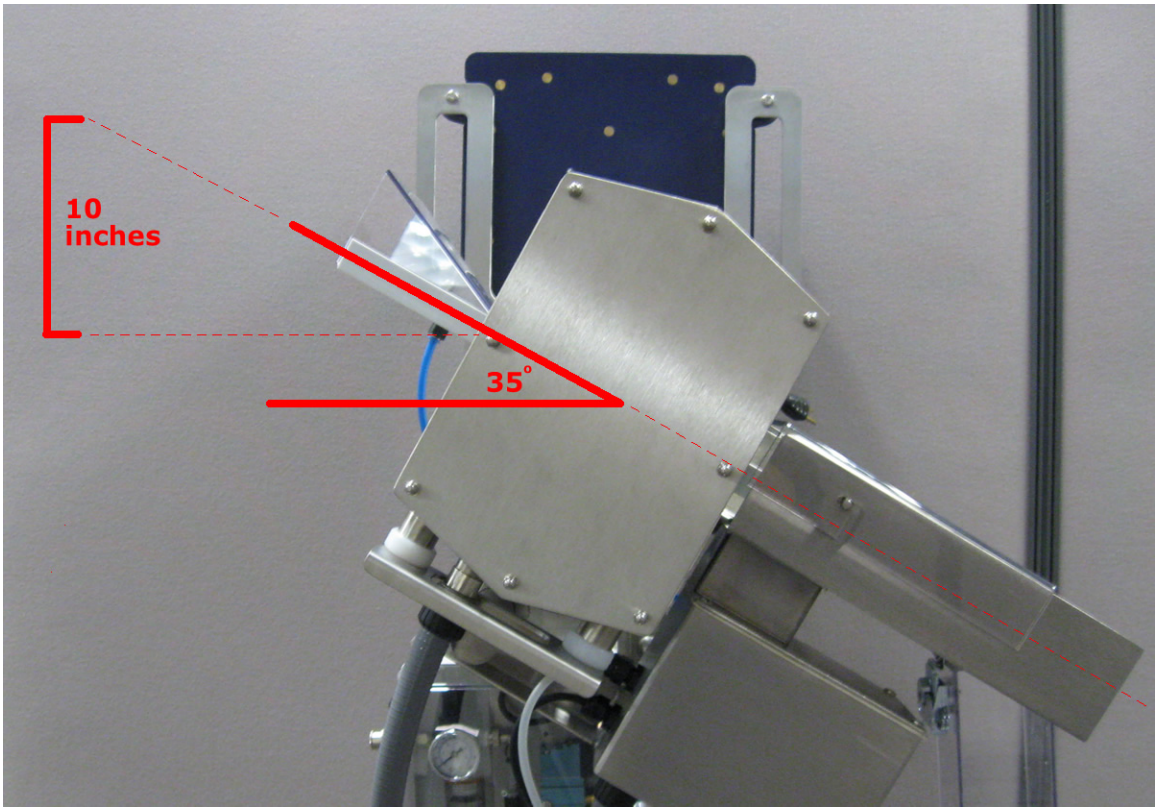
Aligning the APEX 500 Rx in Your Production Line

The next step is to install the APEX in your production line. Please note the following important information about the APEX's default settings.

Important!

The default settings for operating the APEX (which were set at the factory before your APEX was shipped) assume the APEX will be installed in your production line as follows.

- The angle of the input chute is set to 35°—where horizontal equals zero degrees.
- The total vertical drop from your product output-point to the search-head opening is 10 inches (254 mm).
- When the input chute is set to 35° and the vertical drop to 10 inches (254 mm), product should flow through the search head at approximately 300 feet per minute (91 meters per minute). **The default speed-filter setting for the APEX 500 Rx is to use the wide-band filter #2**.



Using A Different Input Angle and/or Vertical Drop

If you need to use a *different* input angle and/or vertical drop because of the way your production line is set up, the rate at which product flows through the search head ("product speed") will—most likely—be different from 300 feet per minute (91 meters per minute). For example, if you use a smaller input angle or vertical drop, product speed will decrease. Conversely, if you use a larger input angle or vertical drop, product speed will increase.

In most instances, changes in product speed do not significantly affect the ability of the APEX to detect metallic contaminants (that is, do not affect APEX "sensitivity") when—the key point—the *default* settings are used. However, if you discover that sensitivity has been affected (described below) because you are using a non-standard input angle or vertical drop, you should change the product speed setting.

In summary, if you use a non-standard input angle or vertical drop, please note the following.

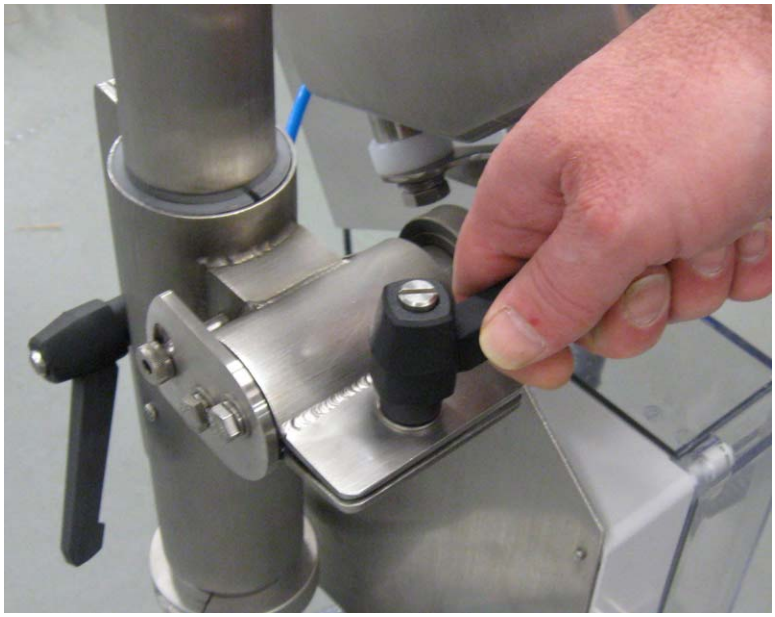
- The default settings assume that product speed = 300 feet per minute (91 meters per minute).

- The product speed setting should be changed *only* if sensitivity is adversely affected—as described in the "Checking APEX Sensitivity" section on page 17 of this manual.

Adjusting the Input Angle and Vertical Drop

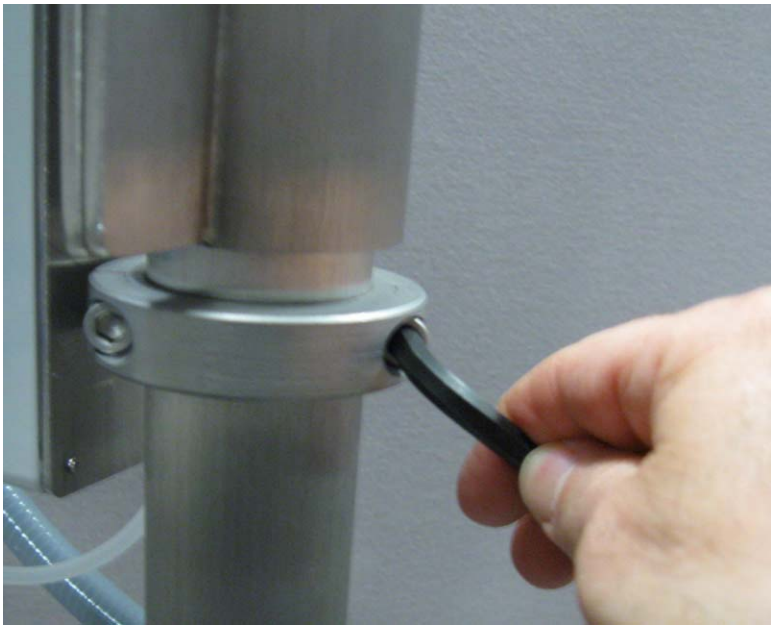
Locate the two black plastic handles (see the photo below and on page 12), which set the angular alignment and vertical alignment of the APEX, and use them to properly align the APEX in your production line.

1) Use this handle to set the angular alignment of the APEX.



2) Use this handle to set the vertical alignment of the APEX.

3) If desired, readjust the safety collar that prevents the APEX 500 Rx from falling to the floor. Loosen the bolts in the safety collar using a ¼" Allen (hexagonal) wrench, slide the collar to its new position, and tighten firmly to secure the safety collar.



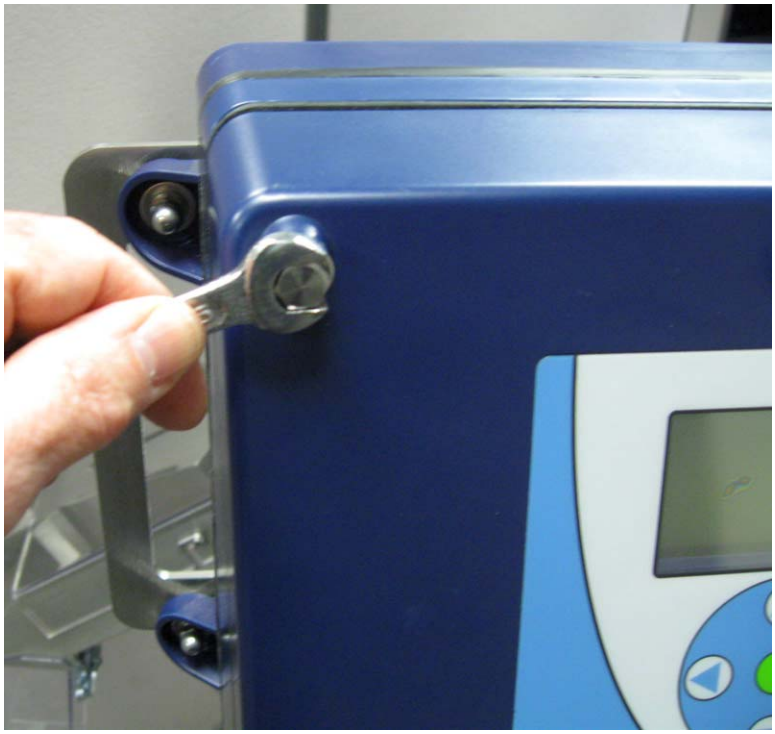
Making the Electrical and Compressed-Air Connections

The last step is to connect the main power cord to the APEX, and connect the APEX to your facility's compressed-air supply.

Connecting the Main Power Cord

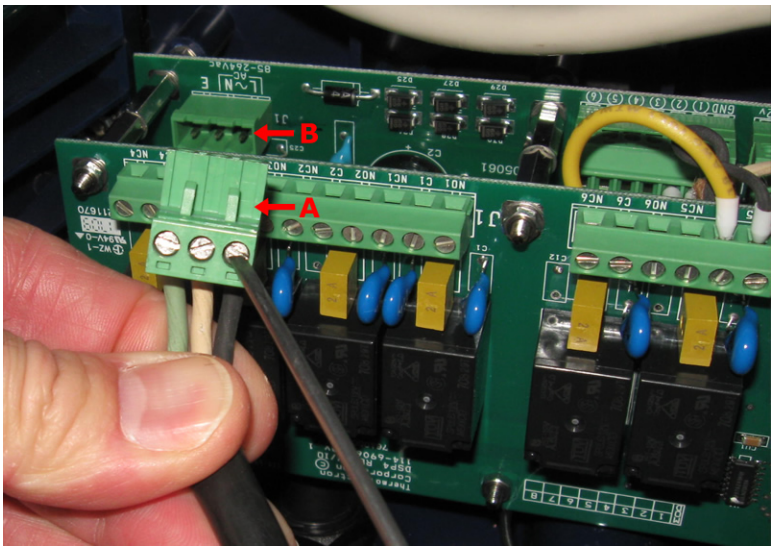
To attach the main power cord to the APEX, do the following.

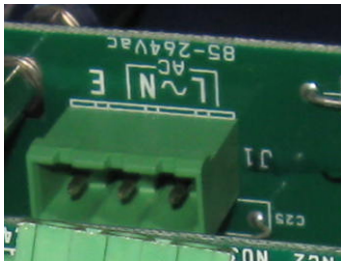
1) Unscrew the eight bolts on the face of the APEX's control panel, and remove the face plate.



2) Feed the main power cord through the hole in the frame and through the black plastic grommet in the base of the control panel, as shown below.

3) Pull the male connector (A) from the female connector (B) and connect the power cord wires to connector A. Please *make sure* you connect the live (L), neutral (N), and ground/earth (E) wires to the correct terminals—as noted above connector B on the integrated circuit board. (The L, N, and E notations are shown *upside-down* above connector B.)





4) Push connector A firmly into connector B.

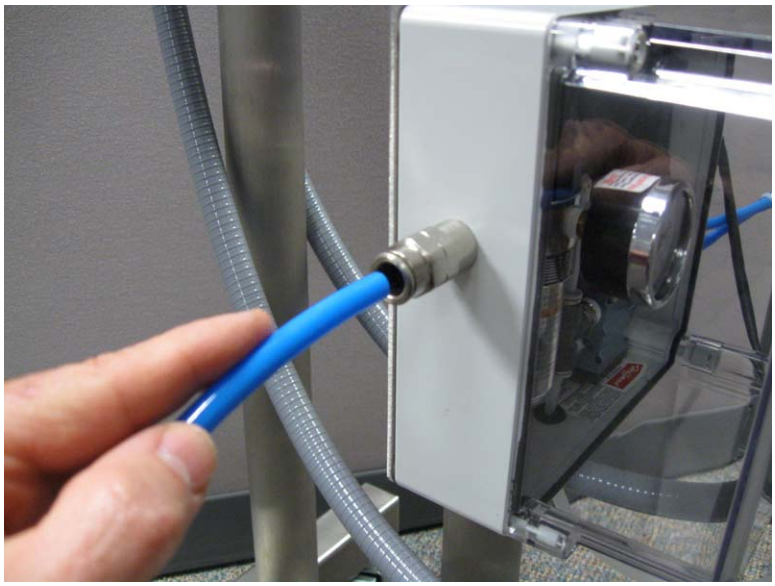
5) Place the face plate on the control panel and reattach using the eight bolts.

Connecting the Compressed-Air Supply

The final step is to connect the APEX to your facility's compressed-air supply, and set the appropriate air pressure for operating the reject gate. The minimum air pressure and volume required to operate the reject gate are as follows.

- Minimum air pressure = 60 psi (pounds per square inch) or 4.13 BAR
- Minimum air volume = 0.5 CFM (cubic feet per minute) or 0.014 CMM (cubic meters per minute)

1) Connect your compressed-air supply to the inlet on the APEX carrier.



2) Set the air pressure to 70 psi (4.82 BAR) using the black regulator valve above the air-pressure gauge, but *do not* exceed 70 psi (4.82 BAR).

Setting Passwords

If you wish to restrict access to your APEX detector, you (as a supervisor) must assign passwords to operators, engineers, and yourself. The following table shows the access privileges of operators, engineers, and supervisors as well as their default passwords. Use the default passwords, when entering this menu for the first time to set up security levels for yourself and your coworkers. Unlike a personal computer, no names are used—only passwords. Thus, all supervisors, engineers, and operators are recognized only by their passwords.

Access Level	User Name	Default Password	Available to this Access Level	Not Available to this Access Level
0	Read/Lock	(None)	View everything Clear peak Language	(N/A)
1	Operator 1	OPR1	AutoLearn Learn detect level Change products	Adjust— Phase angle Detect level
2	Operator 2	OPR2	Manual AuditCheck Manual QAT Manual print Learn and adjust— Phase angle Detect level Learn IXR Edit pack length Learn reject confirmations Reset reject counts	Pack gap Detect no-pack distance Machine settings Reject settings I/O settings Phase and IXR tracking AuditCheck settings QAT settings
3	Engineer	ENGI	Everything except password changes	Passwords NVRAM reset
4	Supervisor	SUPE	Everything	Set APEX model or machine type SF factory menu
5	Factory	–	Model/machine SF factory menu	Password required for every change

More Information

For more information about setting passwords, please see pages 249–253 in the main APEX *User's Guide*.

Checking APEX Sensitivity

This section assumes you have installed the APEX 500 Rx in your production line, as described above. The next step is to test the sensitivity of the APEX—that is, test its ability to detect metallic contaminants—using the test spheres that are supplied with your APEX. Three types of test sphere are supplied: ferrous, non-ferrous, and 316 stainless steel.

There are six steps to testing the sensitivity of the APEX, as follows.

- *Establish a Baseline for Background Noise*
  See pages 101–103 in the main APEX *User's Guide*.

- *Choosing the Correct Speed-Filter Settings for the Rx*
  See page 104 in the main APEX *User's Guide*.

- *Do a Full Product Calibration*
  See pages 105–107 in the main APEX *User's Guide*.

- *Calibrate the AuditCheck Function* (if applicable)
  If your APEX 500 Rx is equipped with the AuditCheck option (which allows the APEX to detect small changes in sensitivity over time), you must calibrate the AuditCheck function. See pages 206–213 in the main APEX *User's Guide*.

- *Drop the Test Spheres Down the Input Chute with No Product Present*
  Make sure *no* product (tablets, caplets, capsules, or other product) is flowing through the search head. Drop the three types of test sphere (ferrous, non-ferrous, and stainless steel) down the input chute from 5–10 times to verify they are rejected by the APEX.

- *Drop the Test Spheres Down the Input Chute with Product Present*
  The final step is to start your product flowing through the search head. Then drop the three types of test sphere down the chute from 5–10 times to verify they are rejected.

Now that you have verified the APEX can detect contaminants in your product stream, you are ready to put it into service as part of your critical quality-control program.

What to Do If the Test Spheres Are Not Rejected

If any of the test spheres are *not* rejected, the sensitivity of the APEX needs to be adjusted. The most common cause of decreased sensitivity—as described above—is using small input angles (<35°) and small vertical drops (<10 inches/254mm), which reduce the product speed below the default setting of 300 feet per minute (91 meters per minute).

This type of problem is usually solved by changing the product-speed setting, and is best done by contacting one of Thermo Fisher Scientific's technical-support personnel (see page 399 of the main APEX *User's Guide).* He or she will step you through the process, because choosing optimum sensitivity settings depends on a number of factors including product speed, detect level, search-head size, and so on.

Fail-Safe Operation

The APEX 500 Rx has been designed for fail-safe operation. The following table outlines the fail-safe failures and the fail-safe actions taken by the APEX.

Fail-safe failure	Fail-safe system action
No electrical input power	The reject gate *closes*. All product (contaminated or uncontaminated) goes into the reject bin.
No air pressure	The reject gate *closes*. All product (contaminated or uncontaminated) goes into the reject bin.
The APEX detects an active fault***** • Reject-verification fault • AuditCheck fault • Any other active fault	The reject gate *closes*. All product (contaminated or uncontaminated) goes into the reject bin.

***** Active faults are always displayed on the Apex 500 Rx control panel. An optional alarm fault output package is available to give a visual (red light) and/or audio (horn) indication when a fault occurs.

Troubleshooting

The table below shows some actions you could take should a problem occur with your APEX 500 Rx.

System Failure	Action
The reject device does not divert the rejected contaminant into the reject bin in time	• Verify air pressure is set to a minimum of 60 PSI. • Verify product and machine settings are correct and have not been altered. • Verify multi-zone setting is turned OFF.
The system does not detect the required test disks.	• Verify product and machine settings are correct and have not been altered. • Perform a full product calibration to set the detect level and phase angle for the selected product. • Verify aperture balance and input tuning settings are calibrated.
The system falsely rejects uncontaminated product.	• Verify product and machine settings are correct and have not been altered. • Perform a full product calibration to set the detect level and phase angle for the selected product. • Verify aperture balance and input tuning settings are calibrated.

Additional Information

For additional information about resolving APEX problems, please see page 262 in the main APEX *User's Guide*.

Additional Information

Listed below are additional sources of information about your APEX 500 Rx.

Modifying 500 Rx Operating Parameters

For more information about changing the operating parameters (such as the reject-delay time, reject-duration time, and so on) for your APEX 500 Rx, please see the "Setting Up Pharmaceutical (500 Rx) Applications" section on pages 95–109 in the main APEX *User's Guide*.

Supplemental Information

The following supplemental information is appended to this manual.

Description	Document
APEX 500 Rx System Outline and Mounting	D07404M-B005
APEX 500 Rx Head and Electronics Outline and Mounting	D07404M-B002
APEX 500 Rx Head, Electronics, and Reject Outline and Mounting	D07404M-B006
APEX 500 Rx Spare Parts Manual Illustration	D07404M-Y001
APEX 500 Rx Pneumatic Reject Field-Wiring Diagram	D07387M-W004

Revision History

Listed below is the revision history of the APEX 500 Rx *User's Guide*.

Revision number	Date released	Details of the release
Revision A	April 2010	First release of the APEX 500 Rx *User's Guide*.
Revision B	June 2010	Update for full system release.